Week One: Introoduction to Deep Learning

Wenjie Niu
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1. Courses in This Specialization

- Neural Networks and Deep Learning
- Improving Deep Neural Networks: Hyperparemeter tuning, Regularization and Optimization.
- Structure your Machine Learning project
- Convolutional Neural Networks
- Natural Language Processing: Building sequence models

2. Neural Network

It's a powerful learning algorith inspired by how the brain works. Here are 2 examples to show what is a Neural Networks.

- Example 1: Single Neural Networks
- Example 2: Multiple Neural Networks

3. Supervised Learning for Neural Network

In supervised learning, we are given a data set and already know what our correct output should look like, having the idea that there is a relationship between the input and the output as shown in Table 1.

Supervised learning is categorized into "regression" and "classification" problems. In a regression problem, we are trying to map input variables to some continuous function, predicting the results within the a continuous output. In a classification problem, we are trying to map input variables into discrete categories.

Table 1. Here are some examples of supervised learning

Input(x)	Output(y)	Application
Home features	Price	Real estate
Ad, user info	Click on ad?(0/1)	Online advertising
Image	Object	Photo tagging
Audio	Text transcript	Speech recognition
English	Chinese	Language translation
Image, Radar info	Other cars position	Autonomous driving

Size	#bedrooms	···	Price (1000$s)
2104	3		400
1600	3		330
2400	3		369
⋮	⋮		⋮
3000	4		540

Figure 1. Structured data

User Age	Ad Id	···	Click
41	93242		1
80	93287		0
18	87312		1
⋮	⋮		⋮
27	71244		1

Four scores and seven years ago...

Text

Figure 2. Unstructured data

There are different types of neural network, for example Convolution Neural Network(CNN) used often for image application and Recurrent Neural Network used for one-dimensional sequence data.

Another significant concept is about structured in Fig. 1 and unstructured data in Fig. 2. Structured data refer to things that has a defined meaning such as price, age while unstructured data refers to thing like pixel, raw audio, text.